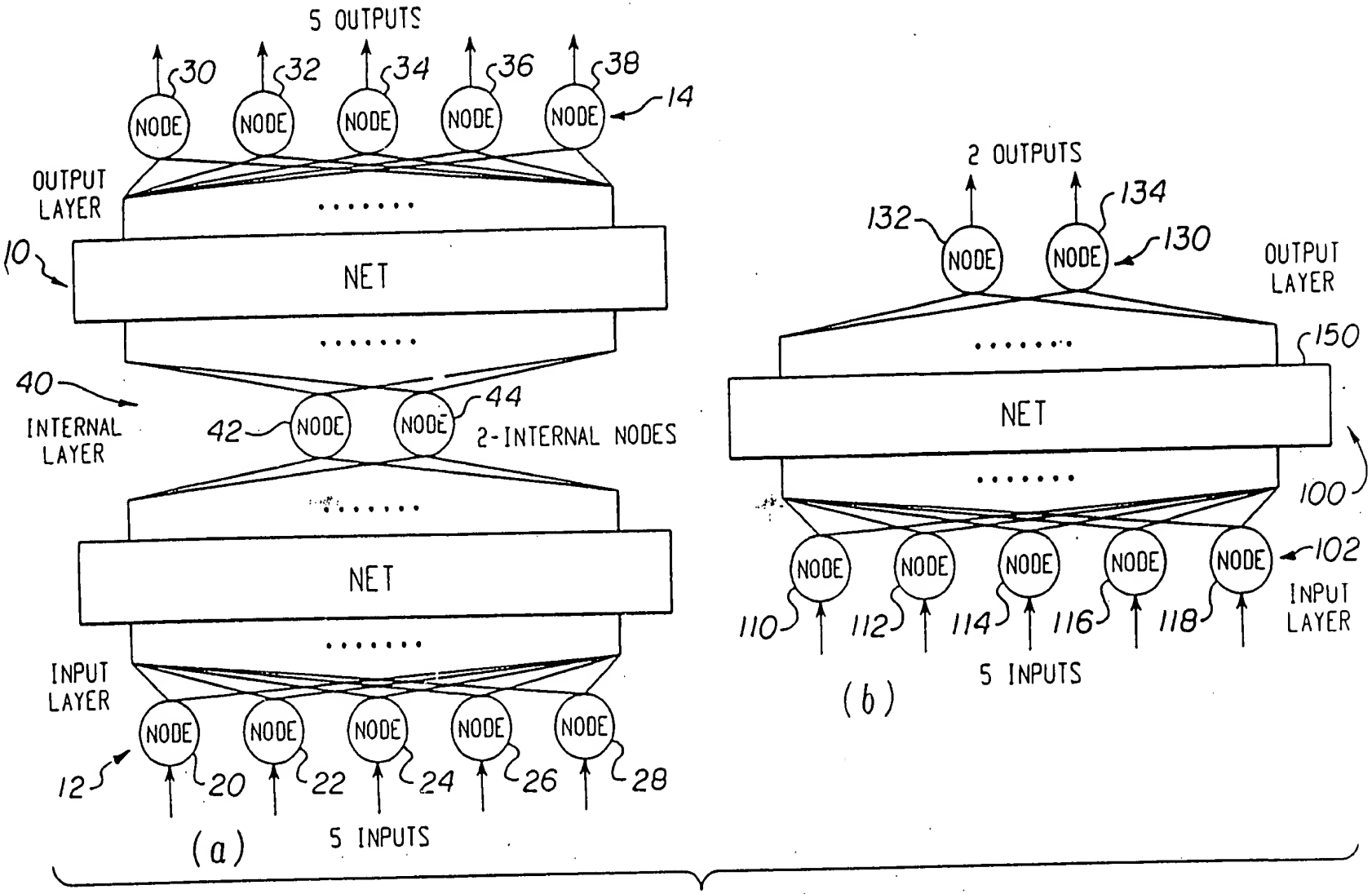

Fig. 1

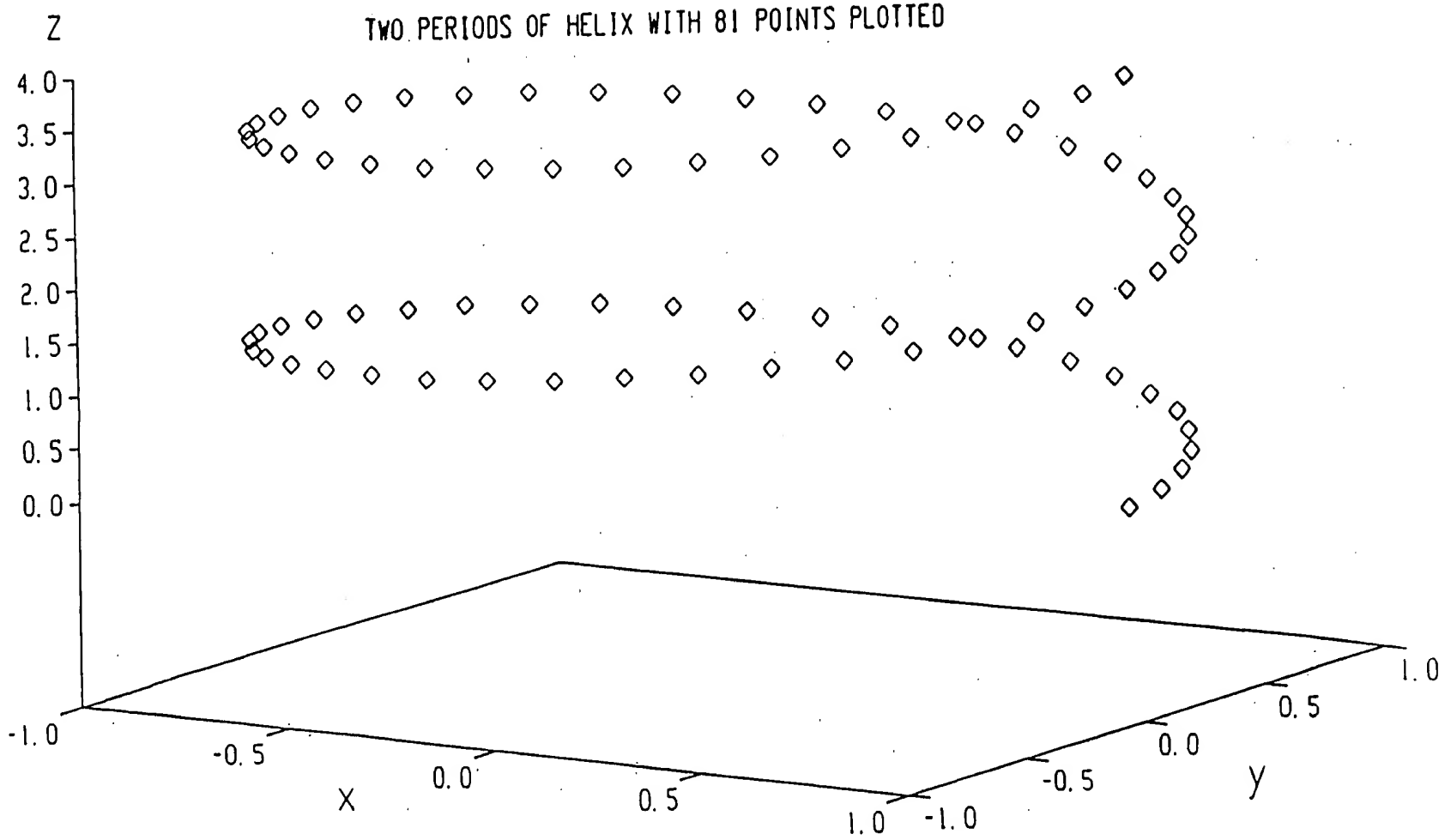
TWO PERIODS OF HELIX WITH 81 POINTS PLOTTED
Z
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-1.0
-0.5
0.0
0.5
1.0
X
-1.0
-0.5
0.0
0.5
1.0
y

Fig. 2

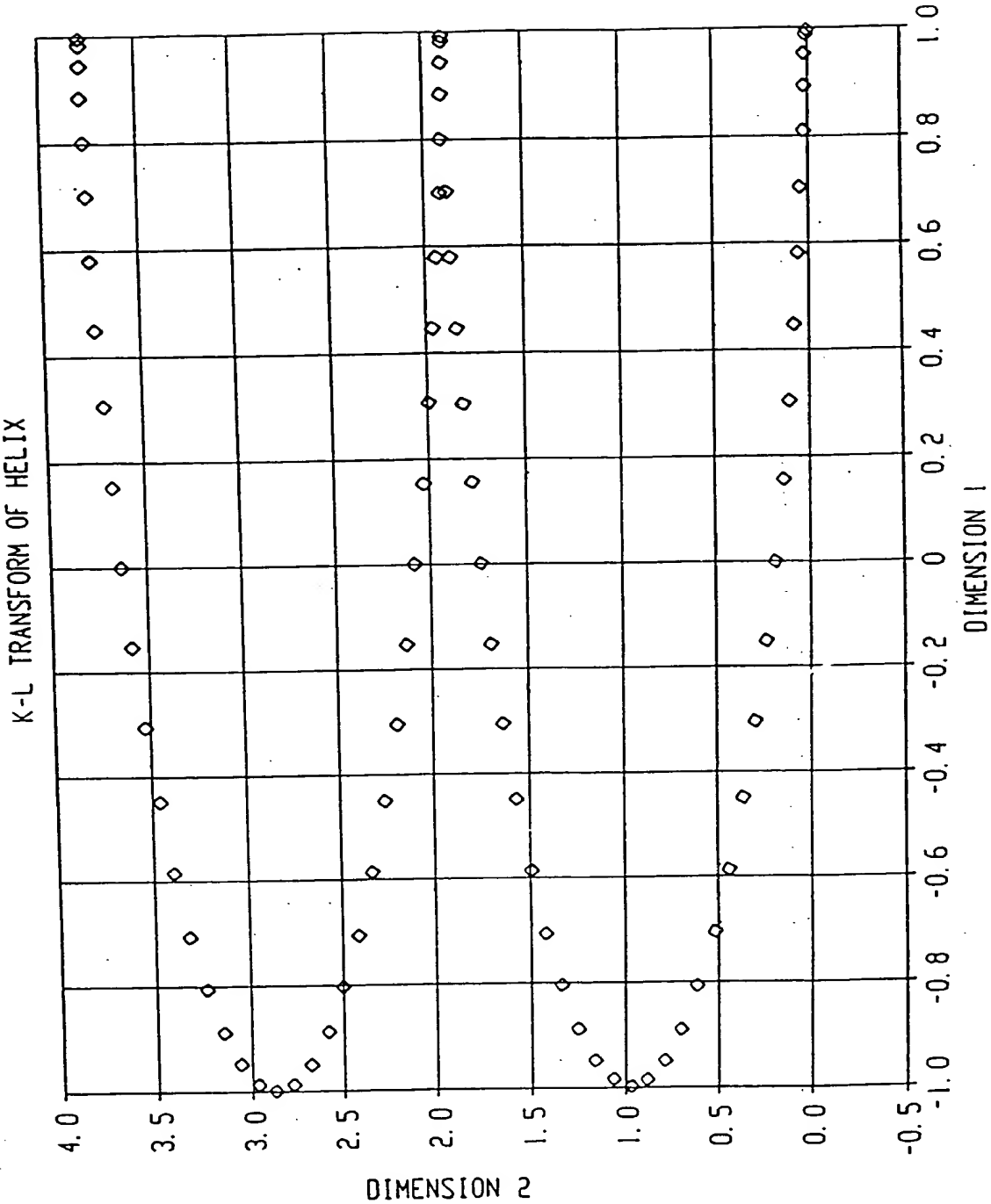
K-L TRANSFORM OF HELIX
DIMENSION 2
DIMENSION 1
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1.0

Fig. 3

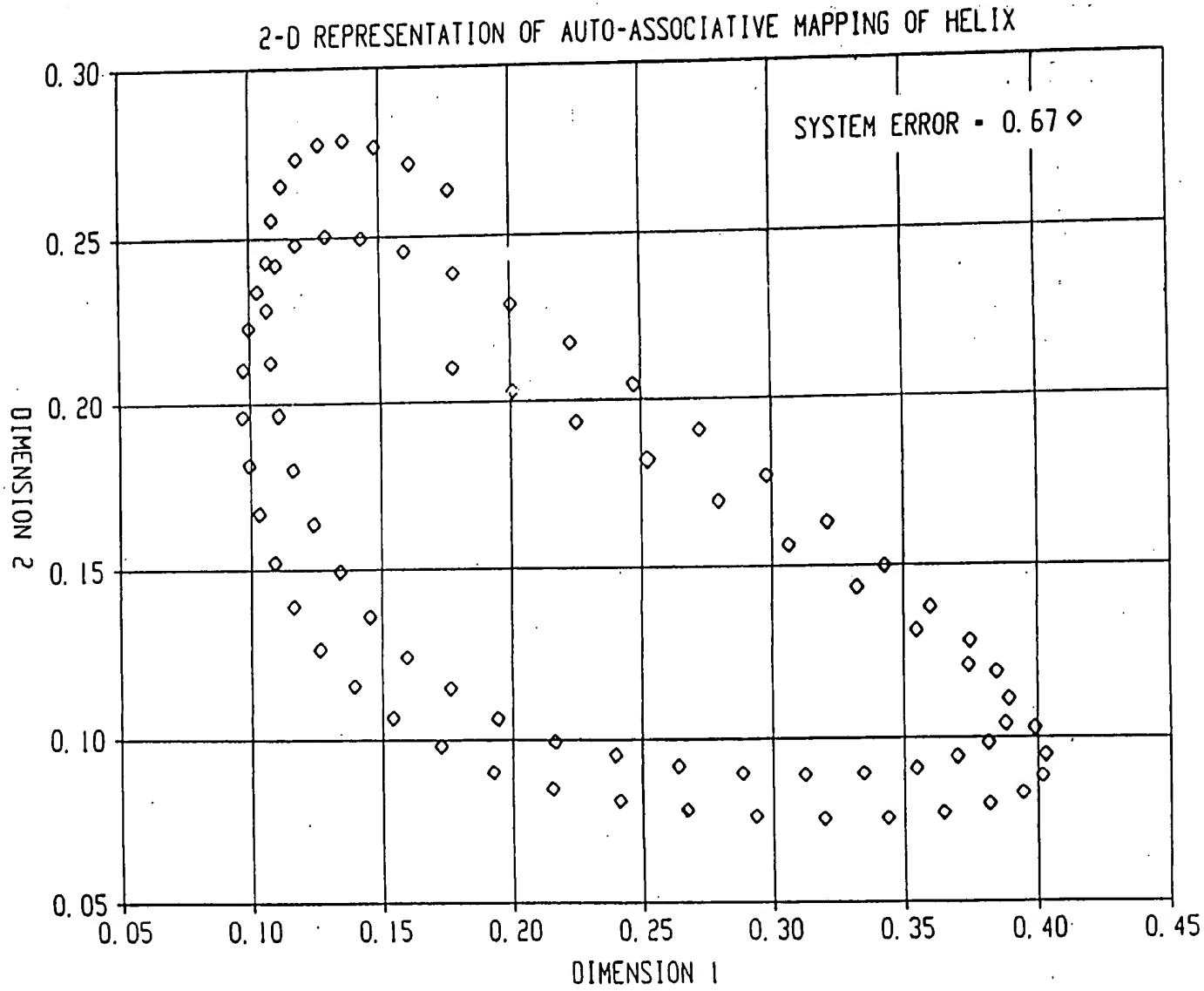

Fig. 4

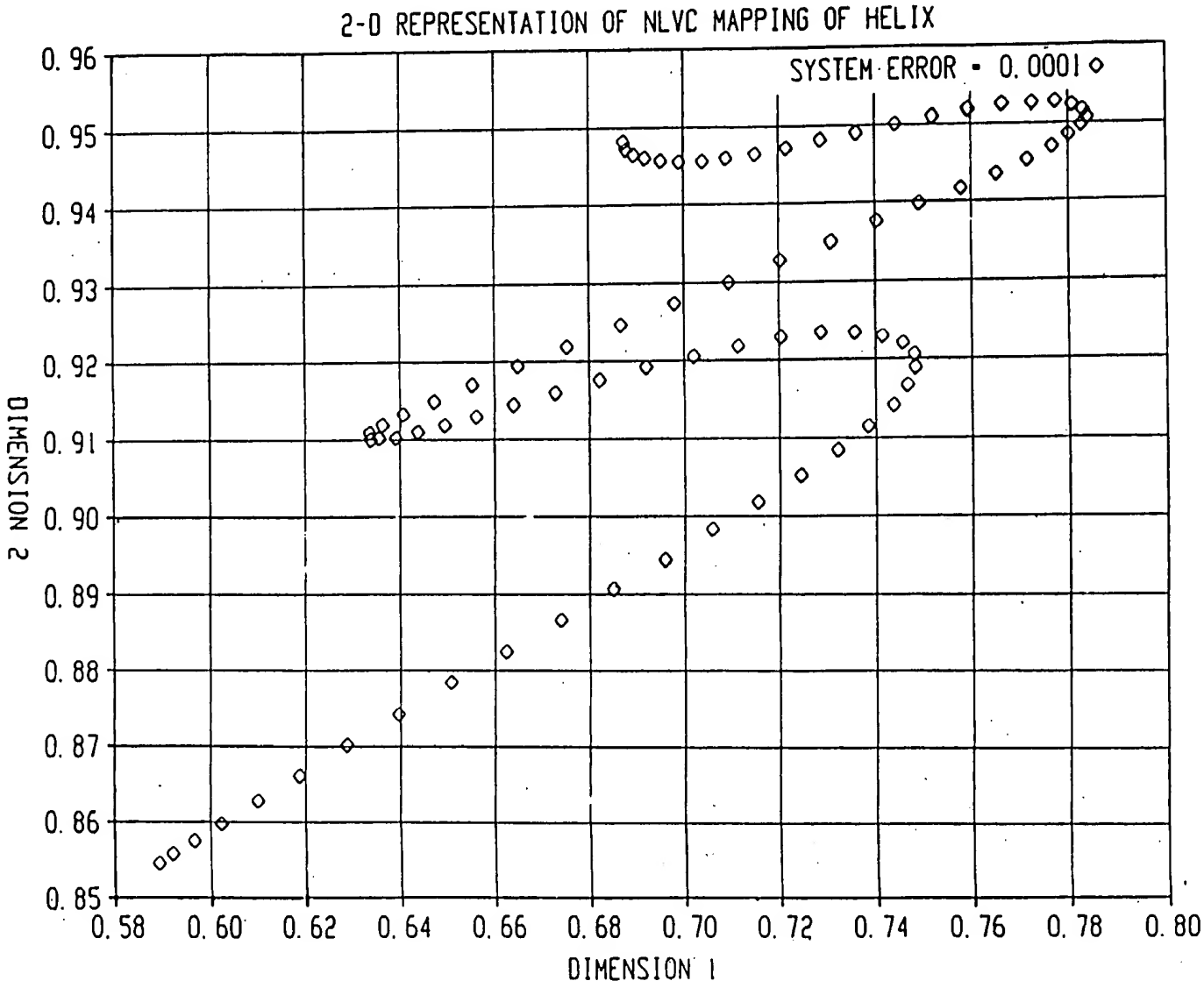

Fig. 5

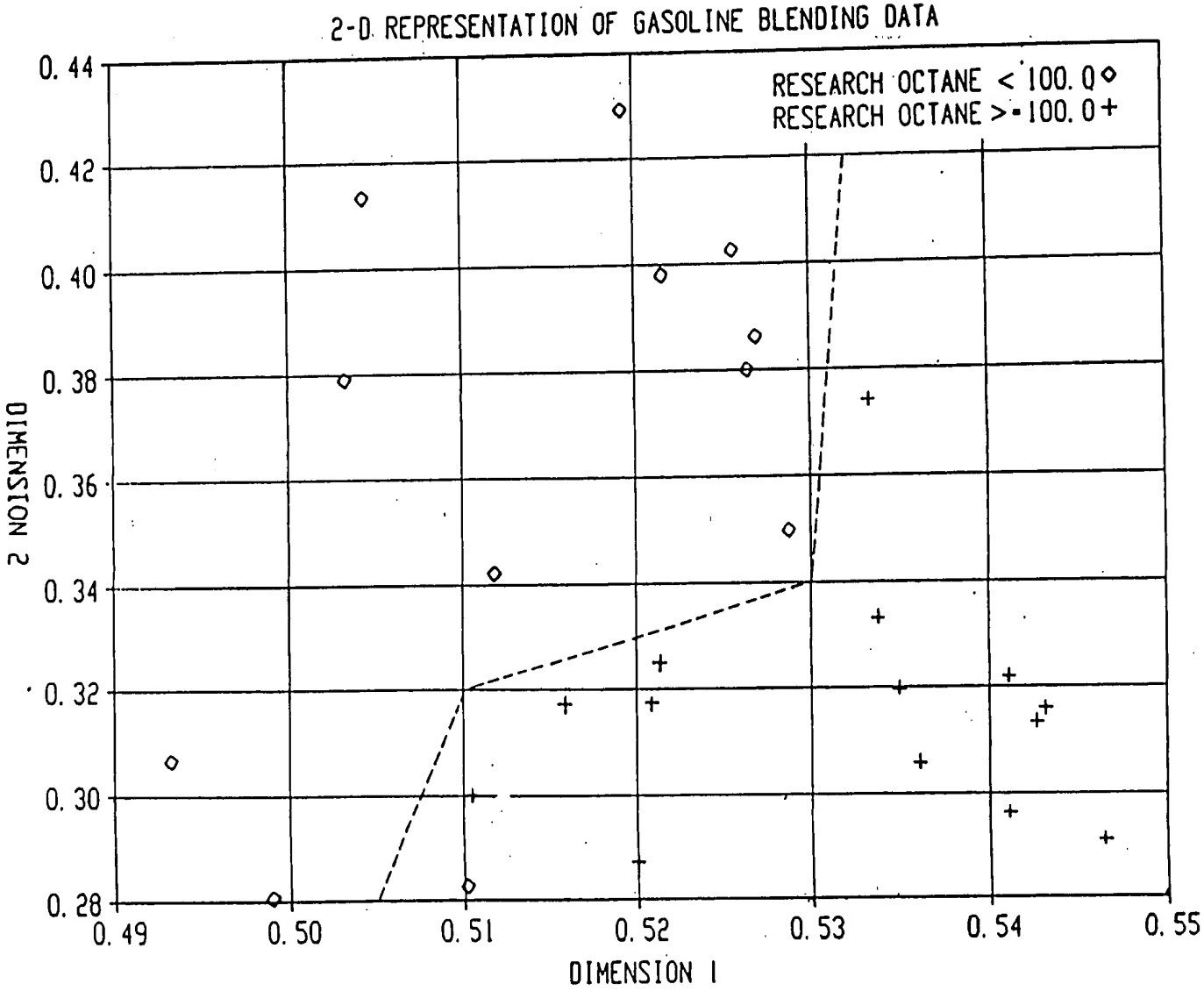

Fig. 6

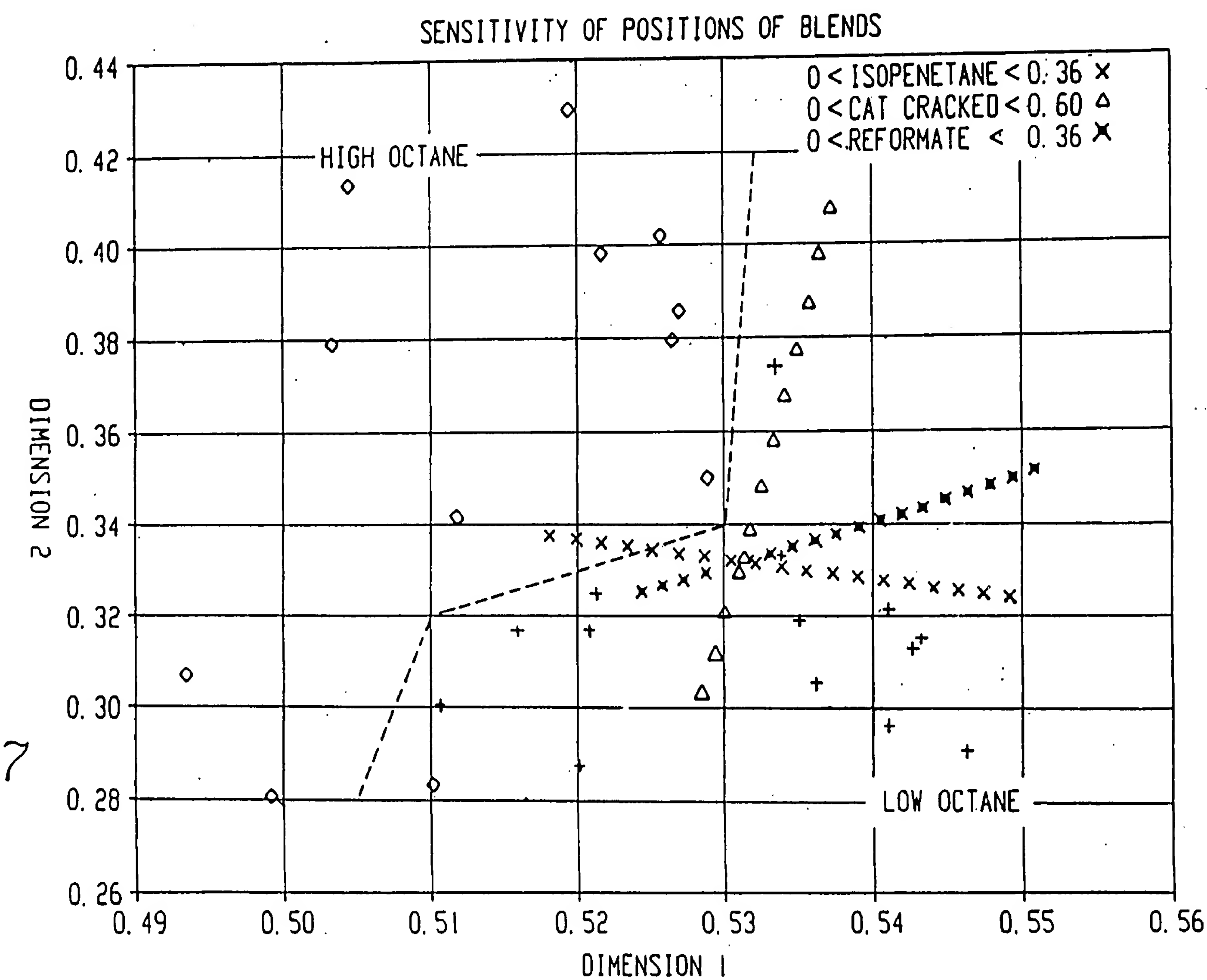
SENSITIVITY OF POSITIONS OF BLENDS
0 < ISOPENETANE < 0. 36
0 < CAT CRACKED < 0. 60
0 < REFORMATE < 0. 36
HIGH OCTANE
LOW OCTANE
DIMENSION 2
DIMENSION 1
0. 44
0. 42
0. 40
0. 38
0. 36
0. 34
0. 32
0. 30
0. 28
0. 26
0. 49
0. 50
0. 51
0. 52
0. 53
0. 54
0. 55
0. 56

Fig. 7

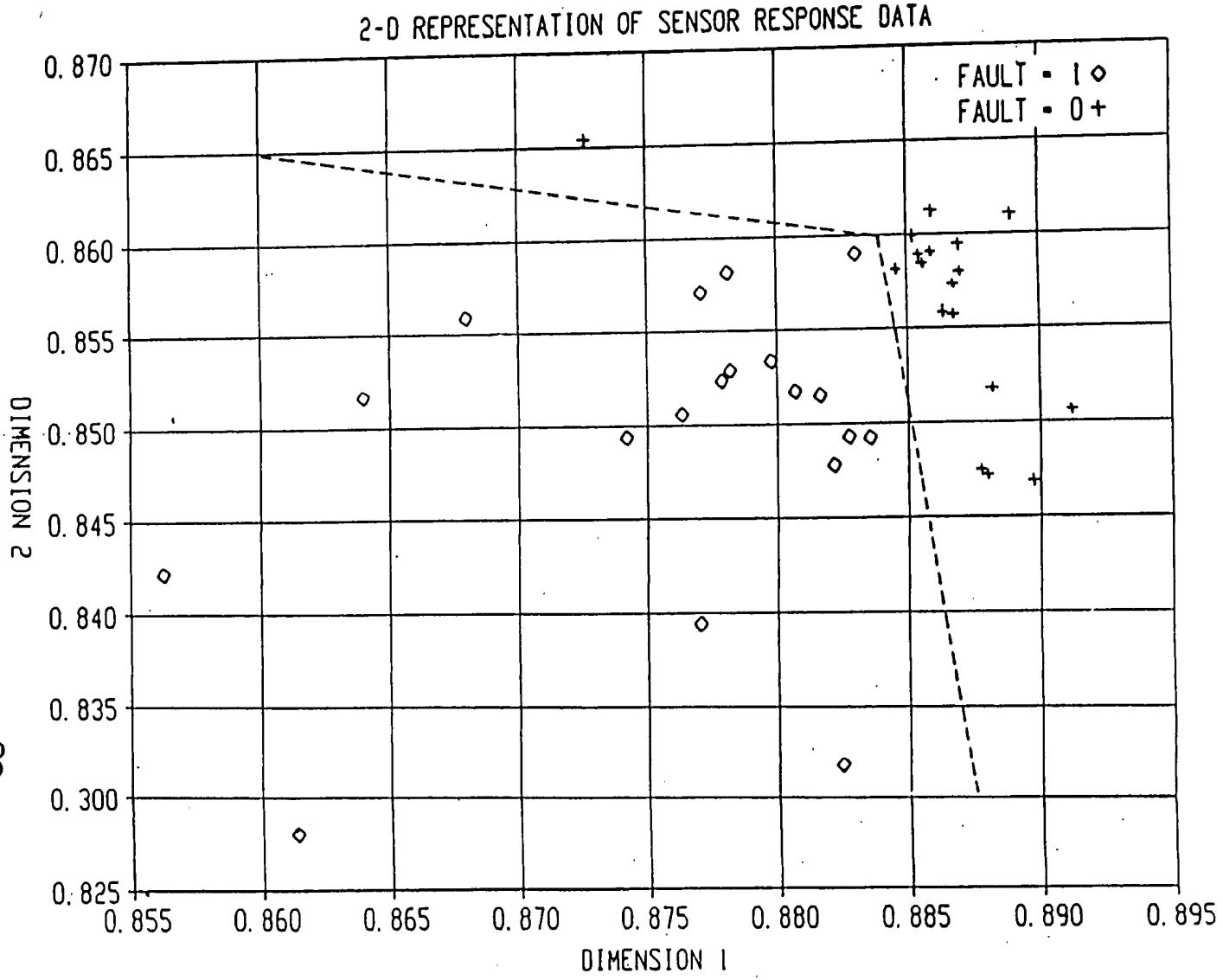

Fig. 8

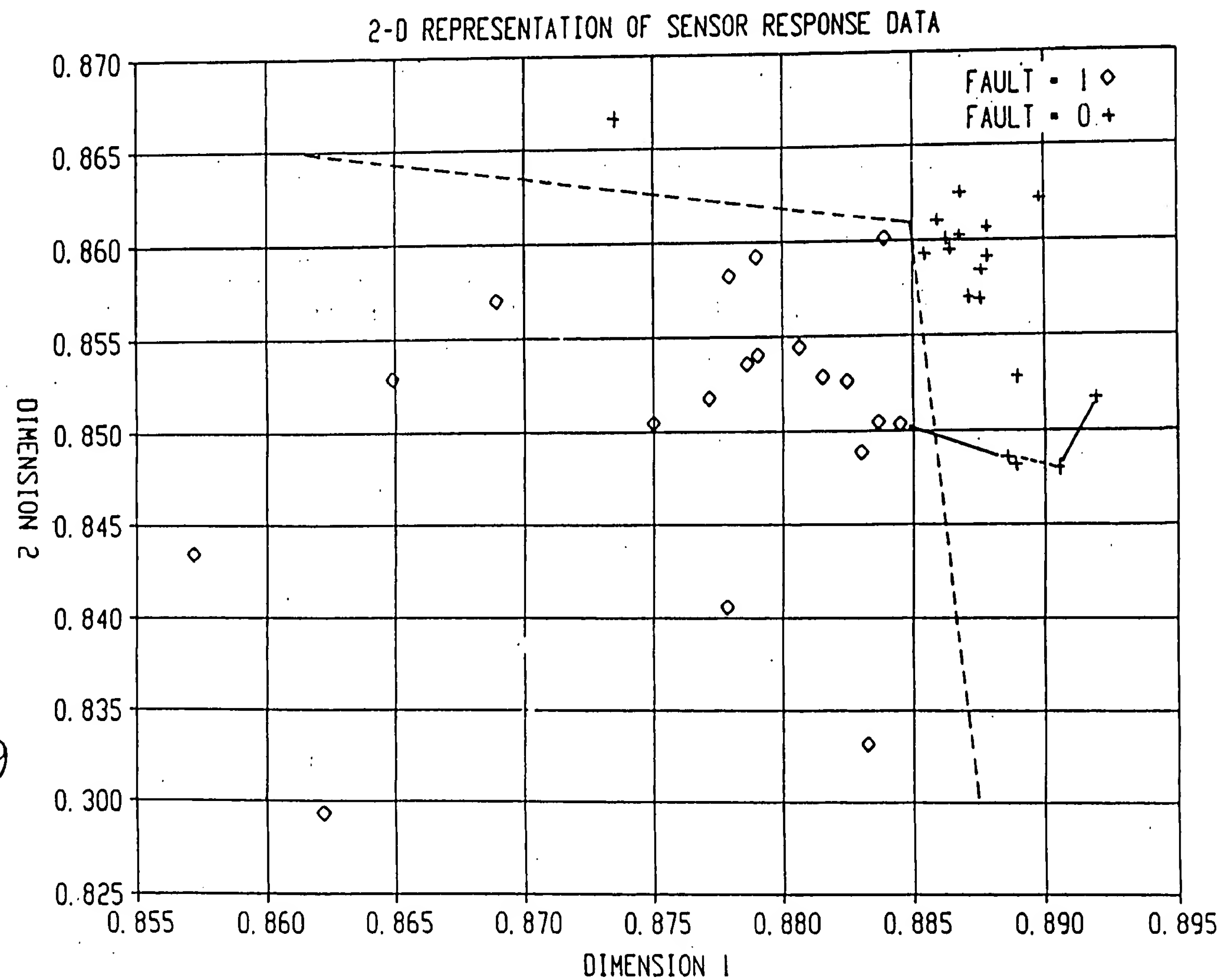
2-D REPRESENTATION OF SENSOR RESPONSE DATA
FAULT = 1 ◇
FAULT = 0 +
0. 870
0. 865
0. 860
0. 855
0. 850
0. 845
0. 840
0. 835
0. 300
0. 825
DIMENSION 2
0. 855
0. 860
0. 865
0. 870
0. 875
0. 880
0. 885
0. 890
0. 895
DIMENSION 1

Fig. 9

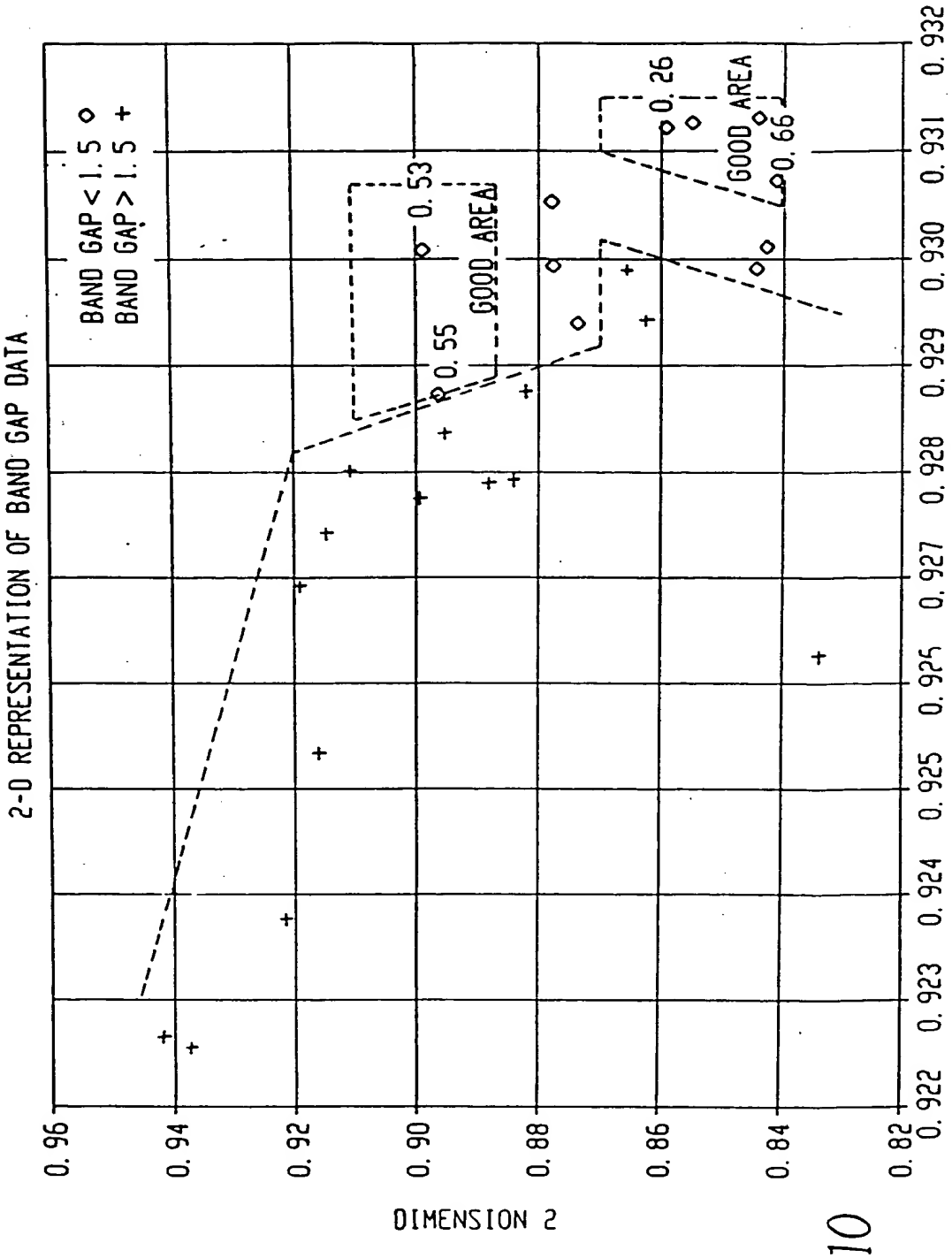
2-D REPRESENTATION OF BAND GAP DATA
BAND GAP < 1.5 ◇
BAND GAP > 1.5 +
0.53
GOOD AREA
0.55
0.26
GOOD AREA
0.66
DIMENSION 2
DIMENSION 1
0.96
0.94
0.92
0.90
0.88
0.86
0.84
0.82
0.922
0.923
0.924
0.925
0.925
0.927
0.928
0.929
0.930
0.931
0.932

Fig. 10

No.	x1	x2	x3	x4	x5	y
1	0.000	0.000	0.350	0.600	0.600	100.0
2	0.000	0.300	0.100	0.000	0.600	101.0
3	0.000	0.300	0.000	0.100	0.600	100.0
4	0.150	0.150	0.100	0.600	0.000	97.3
5	0.150	0.000	0.150	0.600	0.100	97.8
6	0.000	0.300	0.490	0.600	0.051	96.7
7	0.000	0.300	0.000	0.489	0.211	97.0
8	0.150	0.127	0.023	0.600	0.100	97.3
9	0.150	0.000	0.311	0.539	0.000	99.7
10	0.000	0.300	0.285	0.415	0.000	99.8
11	0.000	0.080	0.350	0.570	0.000	100.0
12	0.150	0.150	0.266	0.434	0.000	99.5
13	0.150	0.150	0.082	0.018	0.600	101.9
14	0.000	0.158	0.142	0.100	0.600	100.7
15	0.000	0.000	0.300	0.416	0.239	100.9
16	0.150	0.034	0.116	0.444	0.600	101.2
17	0.068	0.121	0.175	0.332	0.192	98.2
18	0.067	0.098	0.234	0.000	0.270	100.5
19	0.000	0.300	0.192	0.208	0.300	100.6
20	0.150	0.150	0.174	0.226	0.300	100.6
21	0.075	0.225	0.276	0.424	0.000	99.1
22	0.075	0.225	0.000	0.100	0.600	100.4
23	0.000	0.126	0.174	0.600	0.100	98.4
24	0.075	0.000	0.225	0.600	0.100	98.2
25	0.150	0.150	0.000	0.324	0.376	99.4
26	0.000	0.300	0.192	0.508	0.000	98.6

x1 = BUTANE
x2 = ISOPENETANE
x3 = REFORMATE
x4 = CAT CRACKED
x5 = ALKYLATE
y = RESEARCH OCTANE AT 2.0 GRAMS OF LEAD/GALLON

Fig. 11

TABLE 2: TIME-DEPENDENT SENSOR DATA PROFILES

NO.	t:1-5	t:6-11	t:12-17	t:18-23	t:24-29	FAULT
1	0.65190	0.13019	0.31398	0.69901	0.30067	0.00000
2	0.27577	0.56790	0.24946	0.61443	0.70156	1.00000
3	0.86528	0.30303	0.10538	0.56716	0.58797	0.00000
4	0.15642	0.83277	0.58065	0.37313	0.58352	1.00000
5	0.82369	0.27834	0.24731	0.67413	0.90200	0.00000
6	0.35353	0.67116	0.16559	0.65920	0.82405	1.00000
7	0.40958	0.35241	0.41290	0.73881	0.70601	0.00000
8	0.35443	0.33782	0.55054	0.70647	0.71269	1.00000
9	0.54702	0.57350	0.59355	0.67413	0.72606	0.00000
10	0.34177	0.60718	0.79355	0.79851	0.64588	1.00000
11	0.47920	0.65208	0.67312	0.83582	0.74833	0.00000
12	0.35353	0.57800	0.94409	0.95025	0.74610	1.00000
13	0.47197	0.32099	0.36559	0.58209	0.52561	0.00000
14	0.36528	0.39843	0.44731	0.61940	0.55457	1.00000
15	0.44123	0.29854	0.34624	0.57711	0.55457	0.00000
16	0.35805	0.35354	0.42150	0.59701	0.56793	1.00000
17	0.49005	0.32997	0.41505	0.72139	0.67929	0.00000
18	0.31284	0.43547	0.43656	0.72388	0.70601	1.00000
19	0.43309	0.31674	0.39785	0.71642	0.73497	0.00000
20	0.34991	0.36255	0.44946	0.71144	0.73051	1.00000
21	0.46745	0.26936	0.40860	0.69652	0.72160	0.00000
22	0.35262	0.37261	0.42366	0.70398	0.70601	1.00000
23	0.59042	0.25253	0.48602	0.78358	0.82628	0.00000
24	0.38427	0.37486	0.48172	0.79851	0.80401	1.00000
25	0.38156	0.19753	0.40645	0.63930	0.83296	0.00000
26	0.34810	0.52189	0.44516	0.68906	0.72160	1.00000
27	0.75769	0.91134	0.44301	0.61194	0.51225	0.00000
28	0.41863	1.00000	1.00000	0.59453	0.49220	1.00000
29	0.50723	0.36364	0.40645	0.68159	0.71715	0.00000
30	0.34991	0.47250	0.45806	0.70149	0.70156	1.00000
31	0.54069	0.24691	0.38279	0.70647	0.73051	0.00000
32	0.38788	0.40404	0.38710	0.70149	0.72383	1.00000
33	0.41320	0.32660	0.41075	0.68408	0.71715	0.00000
34	0.34991	0.34007	0.49247	0.68906	0.70379	1.00000
35	0.39873	0.35354	0.44516	0.68906	0.69710	0.00000
36	0.33906	0.32323	0.58065	0.70149	0.69710	1.00000
37	0.29747	0.26824	0.42366	0.74378	0.85746	0.00000
38	0.30561	0.21886	0.36129	0.59950	0.67038	1.00000

Fig. 12

TABLE 3: SEMICONDUCTOR CRYSTAL STRUCTURE PARAMETERS AND BAND GAPS

No.	COMPOUNDS	u	a	c	c/a	GAP
1	AgGaS2	0.28	5.75722	10.3036	1.790	2.55
2	AgALS2	0.3	5.73	10.3	1.798	3.13
3	AgGaSe2	0.27	5.755	10.28	1.786	1.8
4	CdSiAs2	0.298	5.884	10.882	1.849	1.55
5	CdGeP2	0.2839	5.738	10.765	1.876	1.72
6	AgAlTe2	0.26	6.296	11.83	1.879	2.25
7	CdGeAs2	0.278	5.9432	11.2163	1.887	0.6
8	AgGaTe2	0.26	6.3197	11.9843	1.896	1.1
9	AgLnTe2	0.25	5.836	11.1789	1.916	1.9
10	CdSnP2	0.265	5.9	11.518	1.952	1.7
11	CuAlSe2	0.26	5.6103	10.982	1.957	2.6
12	AgLnSe2	0.25	6.455	12.644	1.959	0.96
13	CdSnAs2	0.262	6.09	11.94	1.961	0.26
14	ZnGeP2	0.25816	5.46	10.71	1.962	2.34
15	CuAlS2	0.27	5.31	10.42	1.962	3.35
16	ZnGeAs2	0.25	5.66	11.154	1.971	0.75
17	CuFeS2	0.27	5.289	10.423	1.971	0.53
18	AgAlSe2	0.27	5.95	10.75	1.807	2.6
19	CuAlTe2	0.25	5.964	11.78	1.975	2.06
20	CuGaTe2	0.25	6.013	11.934	1.985	1.24
21	CuTiSe2	0.25	5.832	11.63	1.994	1.07
22	ZnSnAs2	0.231	5.851	11.702	2.000	0.65
23	ZnSnP2	0.238	5.65	11.3	2.000	1.66
24	ZnLnSe2	0.224	5.784	11.614	2.008	0.95
25	CuLnS2	0.2	5.5228	11.1321	2.106	1.54
26	CuGaS2	0.25	5.555	11.0036	1.981	1.71

Fig. 13

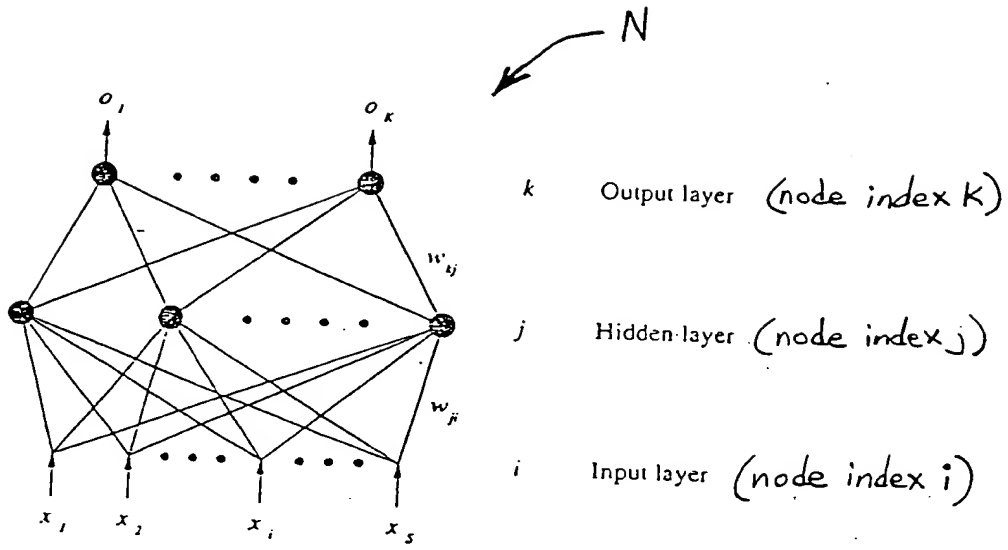
N
o_1
o_k
w_{kj}
w_{ji}
x_1
x_2
x_i
x_s
k Output layer (node index K)
j Hidden layer (node index j)
i Input layer (node index i)

Fig. 14

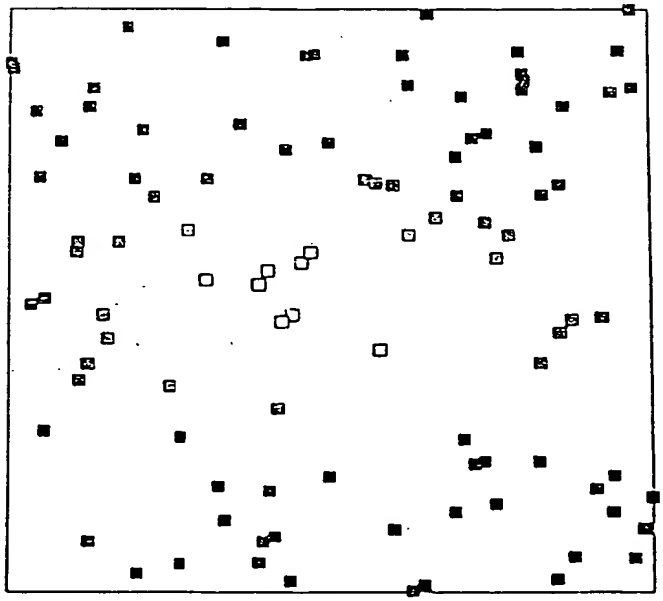

Fig. 15

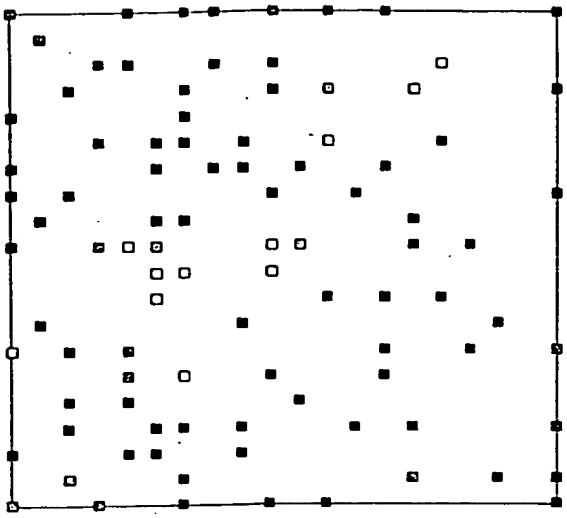

Fig. 16A

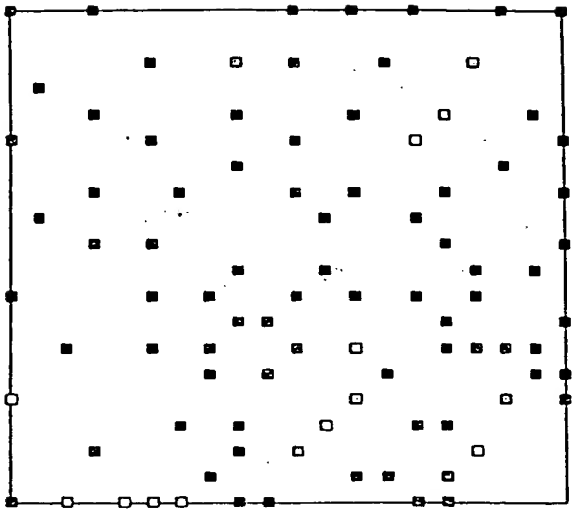

Fig. 16B

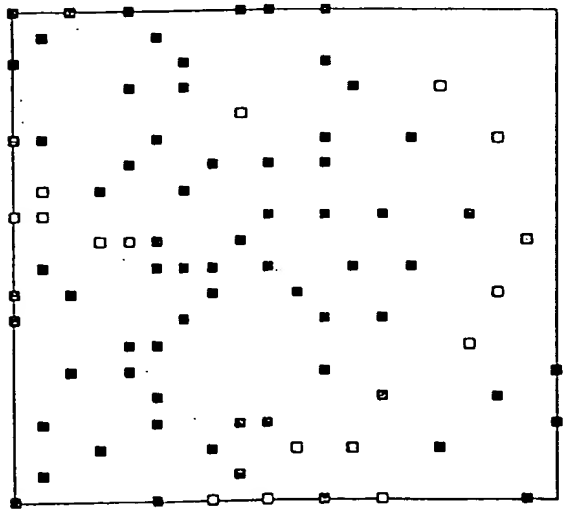

Fig. 16C

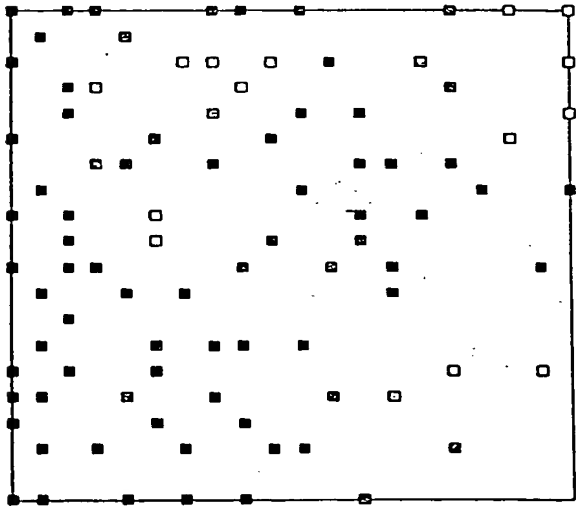

Fig. 16D

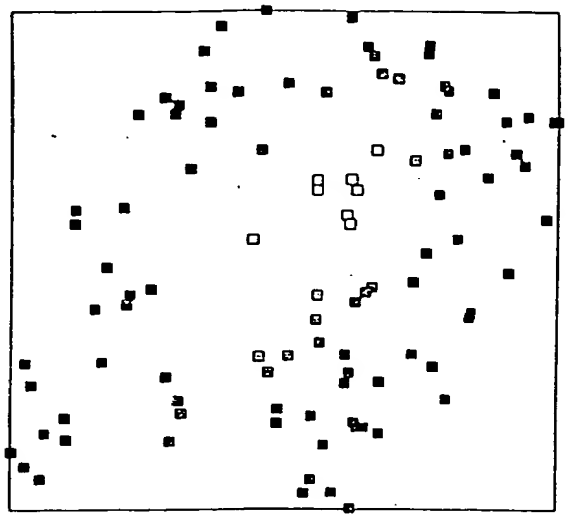

Fig. 17A

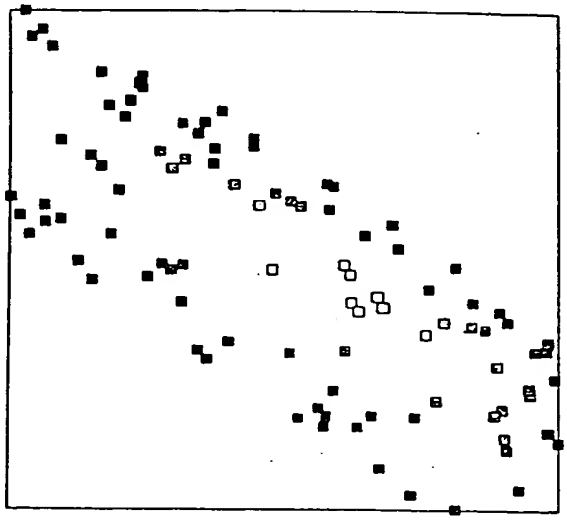

Fig. 17B

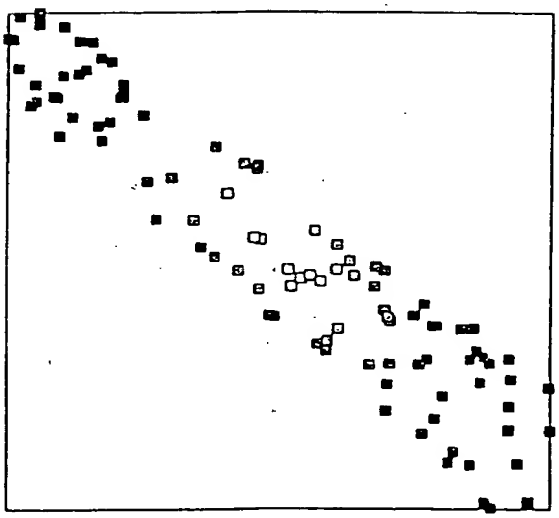

Fig. 17C

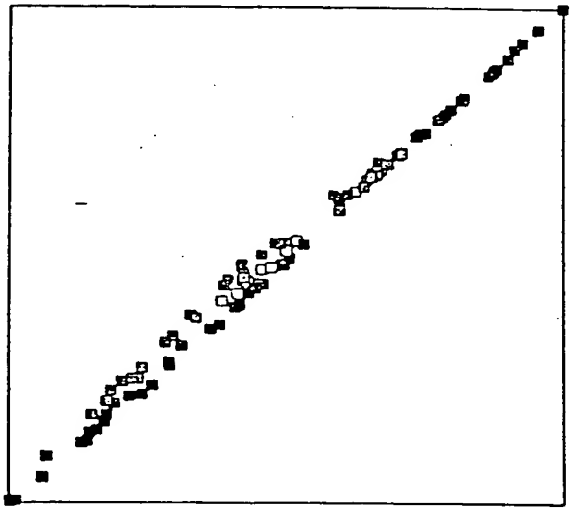

Fig. 17D

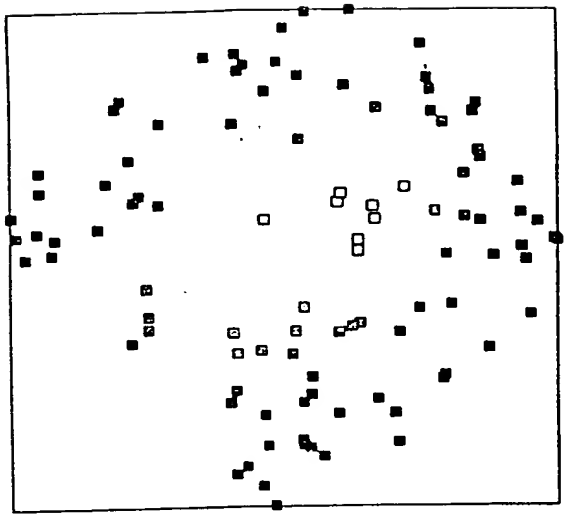

Fig. 18A

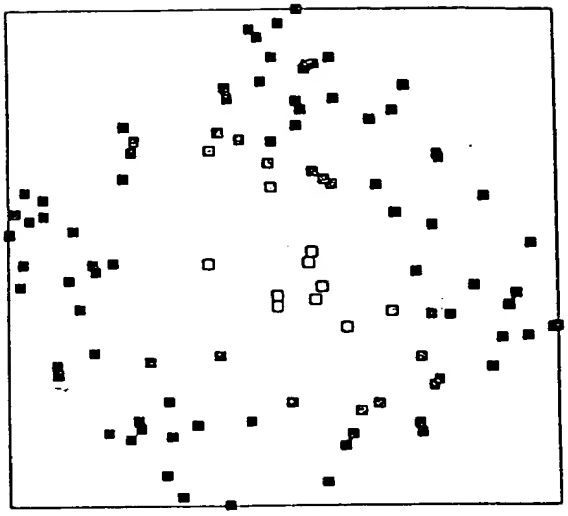

Fig. 18B

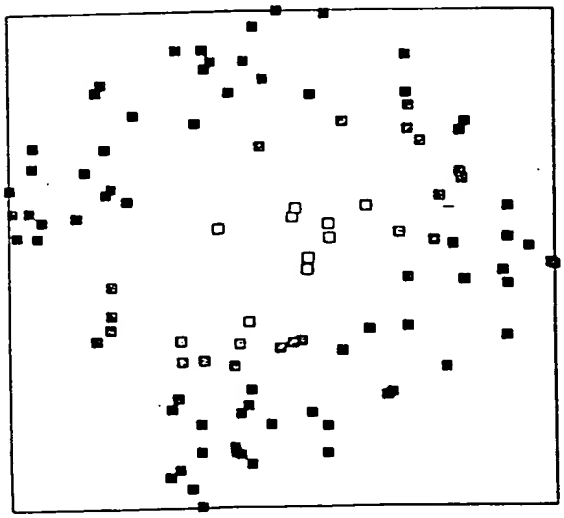

Fig. 18C

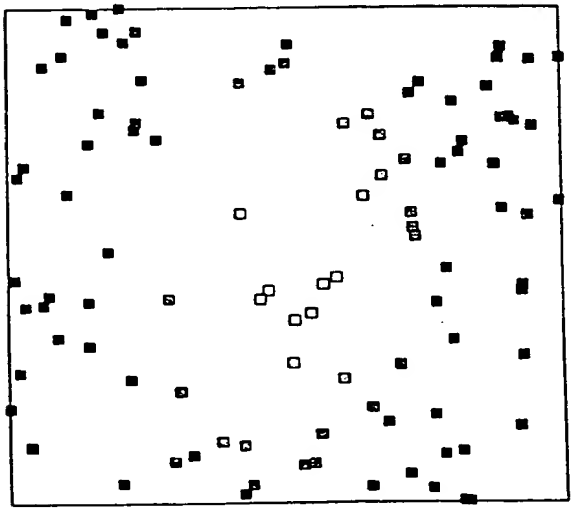

Fig. 18D

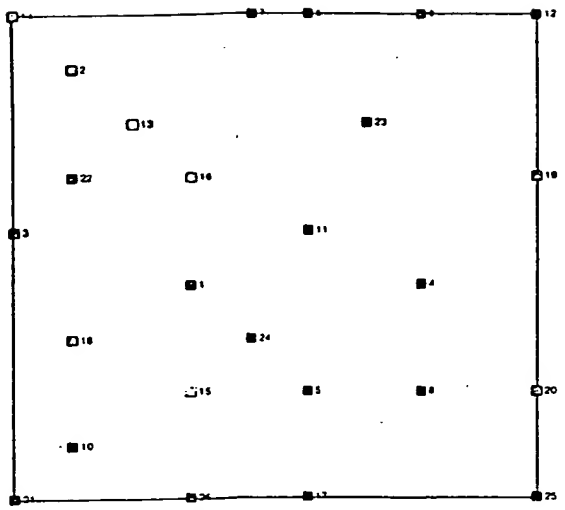

Fig. 19A

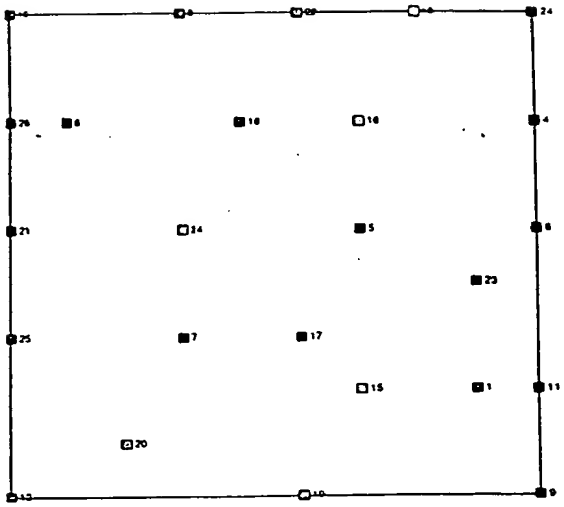

Fig. 19B

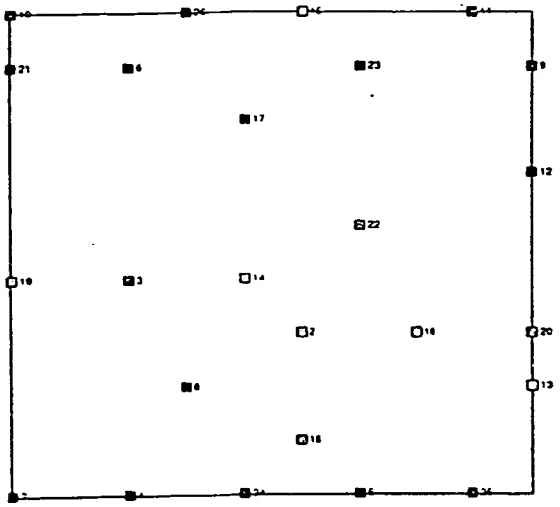

Fig. 19C

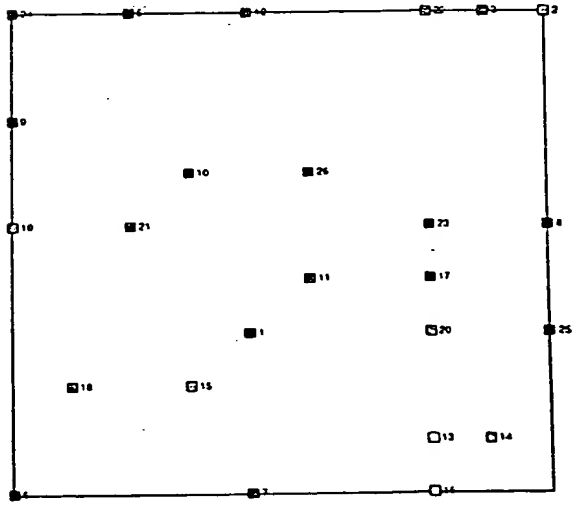

Fig. 19D

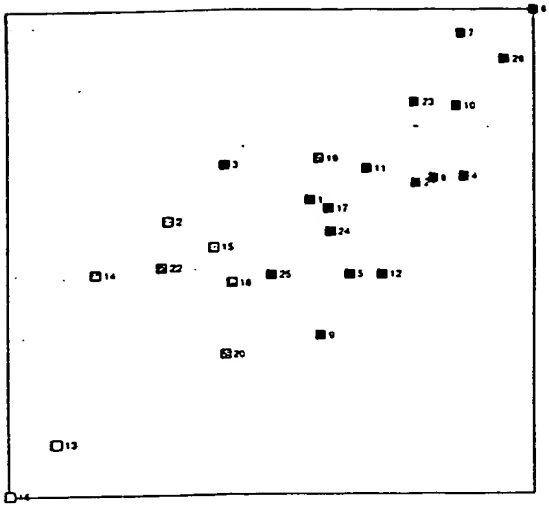

Fig. 20A

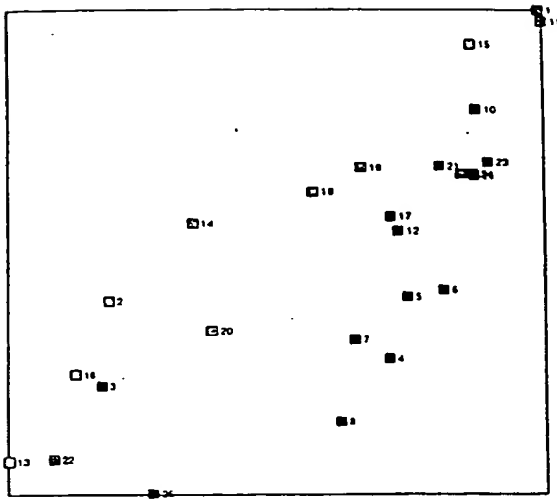

Fig. 20B

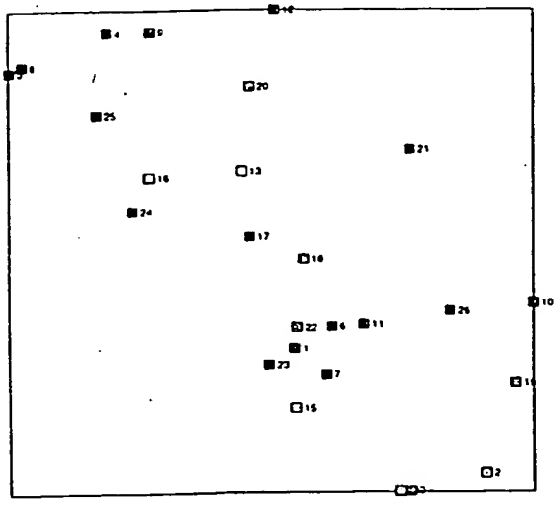

Fig. 20C

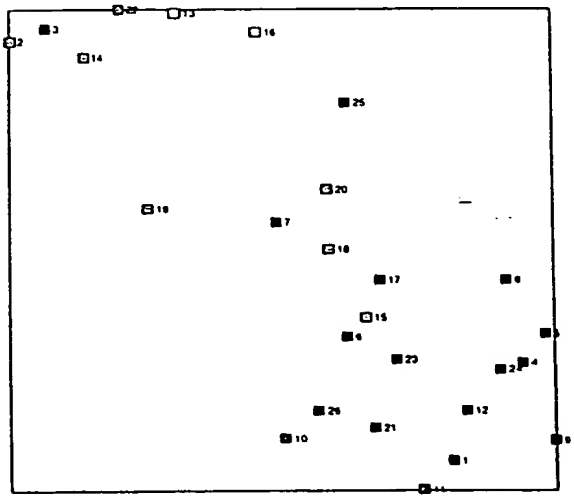

Fig. 20D

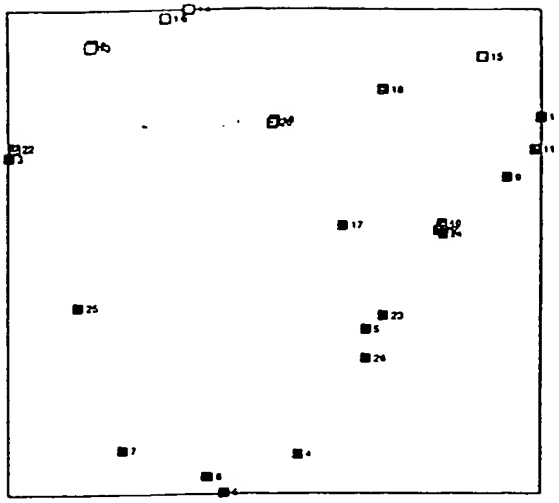

Fig. 21A

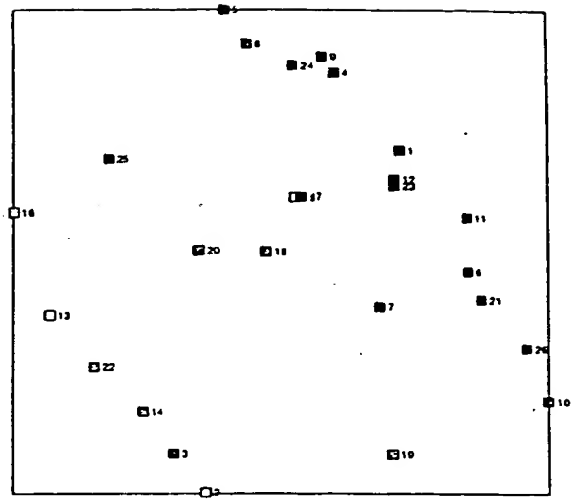

Fig. 21B

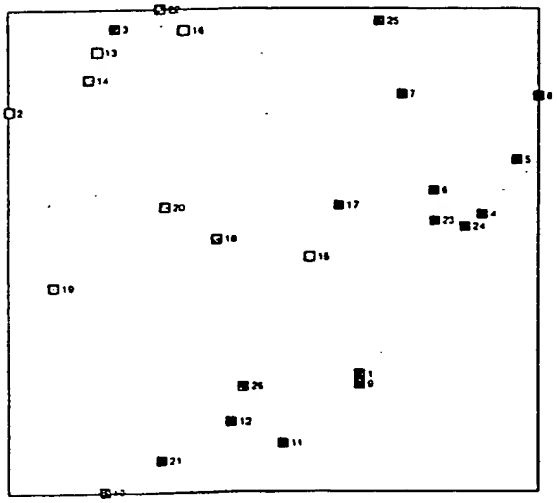

Fig. 21C

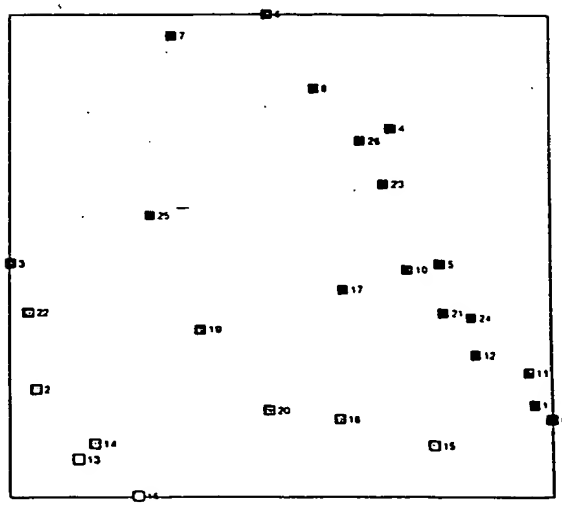

Fig. 21D

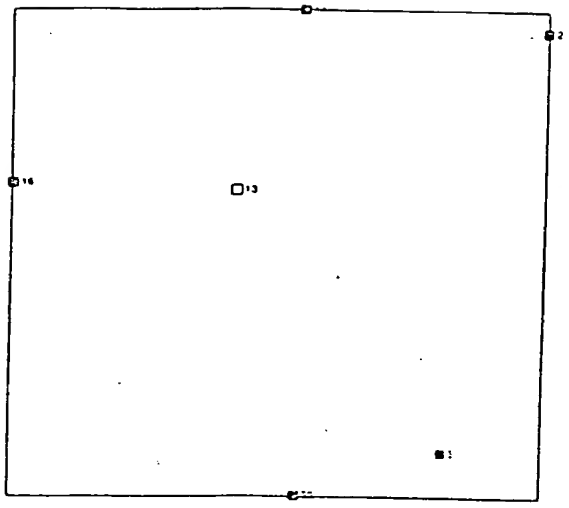

Fig. 22A

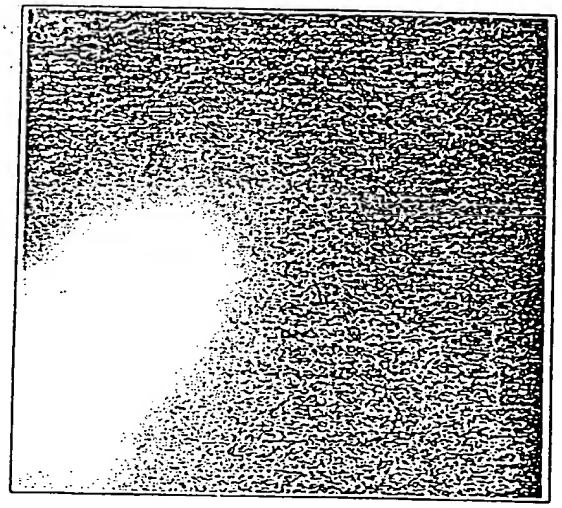

Fig. 22B